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PHARMACOECONOMIC EVALUATION AND PRESCRIBING PATTERN OF ANTIBIOTICS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Antibiotics are the greatest contribution of the 20th century to therapeutics. Antibiotics are the substances produced by microorganisms which selectively suppress the growth or kill the microorganisms at very low concentration. Antibiotics are used to treat various infectious diseases by killing or inhibiting the growth of microorganisms. The appropriate use of antibiotics depends on the selection of an agent capable of achieving a desired concentration to target presumed organism at the site of infection with an acceptable safety profile. Thus it is important to eradicate the irrational use of antibiotics as unnecessary use may lead to Antibiotic resistance. This study thus reveals the Prescribing pattern of Antibiotics in a tertiary care hospital along with the Pharmacoeconomic evaluation of the same. The purpose of the study is to compare and perform a pharmacoeconomic evaluation and analyze prescribing pattern of antibiotics in a tertiary care hospital. A prospective observational study was conducted in all departments of a 450 bedded tertiary care hospital except psychiatry for a period of 6 months from October 2019 to march 2020. The study was conducted by collecting data from patient case sheets and pharmacy. Patients admitted to the psychiatry department and patients who were not willing to participate in this study were excluded. A total number of 100 patients who were on antibiotic therapy were included in the study. Medical records of these patients admitted to these departments during the study period were evaluated to assess the prescribing pattern of antibiotics and cost effectiveness of various brands of antibiotics. Patient demographic details, current complaints, past medical and medication history, antibiotics prescribed, cost of antibiotics and brands involved were collected in specially designed Data entry form. The data were then analyzed by simple graphical method. Pharmacoeconomic evaluation was done for most commonly used antibiotics and cost minimization analysis performed among various brands of Cephalosporins, Pencillins and Fluoroquinolones. Analysis of 100 Prescriptions that met all the criterias of the study reveals that antibiotics were prescribed more among the male population (54%) than females (46%) and the age group of less than 20 years were represented with the maximum antibiotics (23%).LRTI was the most common illness encountered with antibiotics (11.42%) and Most commonly prescribed antibiotics were cephalosporins (53.80%) and aminoglycosides (14.03%). Out of the 3 brands compared for each antibiotics Inj. Cefazone (ceftriaxone), T. Furoxime (cefuroxime), T. Rhifix (cefixime), Inj. Ceforlife (cefoperazone), T. Hhcepo (cefpodoxime), Cap Mox (amoxicillin), Cap Roscillin (ampicillin), T. Aceflox (levofloxacin),

T. Cifran (ciprofloxacin) were found to be cost effective and cost minimized ones. Among the combinations of Antibiotics Inj Niczone SB (ceftriaxone and sulbactam), T. Critcef S (cefixime and sulbactam), Inj Cezon S (cefoperazone and sulbactam), Inj Furokin S (cefuroxime and sulbactam), T. Microcef CV (cefpodoxime and clavulanate), T. Clacent (cefixime and clavulanate), Inj Ritecef T (ceftriaxone and tazobactam), Syrup Augmentin DDS (amoxicillin and clavulanate), Inj. Nimox SB (amoxicillin and sulbactam), Inj Pizoglan (piperacillin and tazobactam), Cap Baxin D (ampicillin and doxacillin), were found to be most cost effective and cost minimized ones. This prospective observational study was carried out in a 450 bedded tertiary care hospital in all departments except psychiatry to analyze the prescribing pattern of antibiotics used and the pharmacoeconomic analysis of three brands of antibiotics from Cephalosporins, Pencillins and Fluoroquinolones. This study thus revealed cost comparison of three brands of various antibiotics from Cephalosporins, Pencillins and Fluoroquinolones given as monotherapies and combinations

INTRODUCTION

Antibiotics are the greatest contribution of the 20th century to therapeutics. Penicillin discovered by Alexander Fleming in 1928 opened the door to this Antibiotic era. Antibiotics are the substances produced by the microorganisms which selectively suppress the growth of or kill the microorganisms at very low concentration. Antibiotics are used to treat the infectious diseases by killing or inhibiting the growth of microorganisms. They can be administered orally, intravenously or intramuscularly. Antibiotics are prescribed for three reasons. One as Prophylaxis where administration is to prevent serious infection at risk situation. Second as Empiric therapy where infection is managed before the presence or cause of infection is found. Third is Directed therapy where Antibiotics against microbes which are confirmed as the cause of infection is given. The appropriate use of antibiotics depends on the selection of an agent capable of achieving a desired serum concentration to target the presumed organism at the site of infection with an acceptable safety profile. Inappropriate and unnecessary usage leads to healthcare cost and pathogen resistance [1]. Antimicrobial Stewardship Program (ASPs) have been developed to limit the use of unnecessary antimicrobial use through reassessment of diagnosis and therapy within 48 – 72 hours , streamlining / de-escalation of antibiotics based on culture and Sensitivity data and the use of antibiotics for the shortest duration needed. Clinical pharmacists, with the help of infectious disease team have an integral role in day to day practice for the judicious use of antibiotics within a short period of time thus promoting further patient safety. As Alexander Fleming quoted in the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug and make them resistant. Antibiotic Resistance is the major problem arising nowadays due to the overdose and leading to death of millions across the world. WHO defines antimicrobial resistance as a microorganism's resistance to an antimicrobial agent that was once able to treat an infection by that organism. A few infections have become completely untreatable due to resistance. Antibiotics should be used only when needed and only when prescribed by health professionals. When antibiotics are being prescribed, the prescriber should closely adhere to the five rights of drug administration i.e. right patient , right drug , right dose , right route and right time .Cultures should be taken before treatment when indicated and treatment should be potentially changed on the susceptibility report. Pharmacoeconomics consist of comparing outcomes and cost of pharmaceutical products, programs and or services to the next best alternatives from selective perspectives. Cost minimization

analysis is the comparison of two interventions or strategies which are assumed to have the same outcomes or effects to find out which is the least costly option. One of the primary applications of pharmacoeconomics in clinical practice today is aid clinical and policy decision making and a powerful tool to support various clinical decisions , ranging from the level of the patients to the level of an entire health care system. [2,3] Percentage price variation = (Maximum cost- Minimum cost/Minimum cost)*100

MATERIALS AND METHODS

A prospective observational study was conducted in all departments of a 450 bedded tertiary care hospital except psychiatry for a period of 6 months from October 2019 to march 2020. The study was conducted by collecting data from patient case sheets and pharmacy. Patients admitted to the psychiatry department and patients who were not willing to participate in this study were excluded. A total number of 100 patients who were on antibiotic therapy were included in the study. Medical records of these patients admitted to these departments during the study period were evaluated to assess the prescribing pattern of antibiotics and cost effectiveness of various brands of antibiotics. Patient demographics details, current complaints, past medical and medication history, antibiotics prescribed, cost of antibiotics and brands involved were collected in specially designed Data entry form. The data were then analyzed by simple graphical method. Pharmacoeconomic evaluation was done for most commonly used antibiotics and cost minimization analysis performed among various brands of cephalosporins, minimization analysis performed among various brands of cephalosporins, pencillins, minimization analysis performed among various brands of cephalosporins, pencillins, and fluoroquinolones [4,5].

RESULT AND DISCUSSION

A total number of 100 patients were included in the study and their demographic data, social history, past medication history, medications used, dosage forms, category of drugs, number of days prescribed, concurrent medications prescribed, severity and risk category of drug interactions and cost of medications were analysed. The demographic analysis suggested that males (54%) were represented with more Antibiotics, compared to females (46%) (table1)

Table 1: Distribution based on gender.

Gender	Number Of Prescriptions	Percentage (%)
MALE	54	54
FEMALE	46	46

The age group less than 20 years were found to be represented with maximum antibiotic prescription (23%) and minimum antibiotic prescription for patients of 31-50 years (7%) (Table 2). [6] n=100

Table 2: Distribution based on Age

Age	Number Of Prescriptions	Percentage (%)
0- 20	23	23
21-30	11	11
31-40	7	7
41-50	7	7
51-60	16	16
61-70	14	14
71-80	13	13
81-90	9	9

Here, most of the patients prescribed with antibiotics were admitted in General Medicine (24%), followed by Paediatrics (19%), Gynaecology (11%), Cardiology (12%), Surgery (11%),Neurology(9%), Orthopaedics (9%)(table 3).[7] n= 100

Table 3: Distribution based on Departments

Departments	Number Of Prescriptions	Percentage (%)
General Medicine	24	24
Pediatrics	19	19
Cardiology	17	17
Gynecology	11	11
Surgery	11	11
Neurology	9	9
Orthopedics	9	9

In our study, 31.57% patients were prescribed antibiotics for 5 days followed by 18.12% were prescribed antibiotics for 4 days and 16.95% for 3 days respectively (table 4).

N=171, n=100

Table 4: Distribution based on number of days antibiotics prescribed

Days	No Of Prescriptions	Percentage (%)
1	9	5.26
2	16	9.35
3	29	16.95
4	31	18.12
5	54	31.57
6	17	9.94
7	9	5.26
8	3	1.75
9	2	1.16
10	1	0.58

In This Study 45% Patients Were Prescribed With Single Antibiotic Whereas 34% Patients With 2 Antibiotics, 19% With 3 Antibiotics And 4% With 4 Antibiotics Respectively (Table 5).

N=171, N=100

Table 5: Distribution Based On No of Antibiotics Prescribed

No Of Antibiotics.	No Of Prescriptions	Percentage (%)
1	45	26.31
2	34	19.88
3	19	11.11
4	4	2.33

In our study, 127 antibiotics (74.26%) were prescribed parentally and 44 antibiotics (25.73%) were prescribed orally (table 6).

n=100, N=171

Table 6: Distribution based on Route of administration of Antibiotics

Route of Administration	Number Of Antibiotics	Percentage (%)
ORAL	44	25.73
SYSTEMIC	127	74.26

Majority of the patients were prescribed with cephalosporins (53.80%) followed by aminoglycosides (14.03%) and penicillins (9.94%) respectively (table 7).

N=171,n=100

Table 7: Distribution based on Types of Antibiotics Prescribed

Types Of Antibiotics	Number Of Prescriptions	Percentage (%)
Cephalosporins	92	53.80
Aminoglycosides	24	14.03
Penicillin	17	9.94
Fluroquinolones	14	8.18
Nitroimidazoles	13	7.60
Macrolides	5	2.92
Carbapenem	3	1.75
Tetracycline	3	1.75

Analysis Of The Diagnostic Pattern Suggested That Lrti (11.42%) Was The Most Common Illness Encountered, Followed With Acute Gastroenteritis (8.57%), Uti (6.66%), Cad-Acs (6.66%) (Table 8)

N=105, N=100

Table 8: Distribution Based On Diagnosis

Diagnosis	Number Of Prescriptions	Percentage (%)
LRTI	12	11.42
ACUTE GASTROENTERITIS	9	8.57
UTI	7	6.66
CAD ACS	7	6.66
CAD MI	6	5.71
PNEUMONIA	5	4.76
VIRAL FEVER	4	3.80
PULMONARY EDEMA	4	3.80
FTND	3	2.85
ENDOMETRIAL HYPERPLASIA	3	2.85
APPENDICITIS	3	2.85
HEAD INJURY	3	2.85
BPH	2	1.90
URTI	2	1.90
DENGUE FEVER	2	1.90
COPD	2	1.90
LSCS	2	1.90
SDH	2	1.90
OTHERS	27	25.71

DISTRIBUTION BASED ON COMORBIDITIES

N=98,n=100

Table 9: Distribution based on comorbidities

COMORBIDITY	NUMBER OF PRESCRIPTIONS	PERCENTAGE (%)
HYPERTENSION	32	32.65
DIABETES MELLITUS	21	21.42
DYSLIPIDEMIA	15	15.30

CAD	11	11.22
COPD	6	6.12
LRTI	3	3.06
UTI	2	2.04
OTHERS	8	8.16

PRESCRIPTION ANALYSIS IDENTIFIED BY LEXICOMP.

n=100

Table 10: Prescription analysis identified by lexicomp

PRESCRIPTION	NO. OF PRESCRIPTIONS	PERCENTAGE
WITH DI	58	58
WITHOUT DI	42	42

PRESCRIPTION ANALYSIS IDENTIFIED BY MEDSCAPE.

n=100

Table 11: Prescription analysis identified by medscape

PRESCRIPTION	NUMBER OF PRESCRIPTIONS.	PERCENTAGE.
WITH DDI	51	51
WITHOUT DDI	49	49

SEVERITY OF DDI IDENTIFIED BY MEDSCAPE AND LEXICOMP

n=10

Table 12 : Severity of DDIs identified by Medscape and Lexicomp

MAJOR	MODERATE OR SIGNIFICANT	MINOR
5	66	29

From this study, its evident that the most commonly prescribed antibiotics was Ceftriaxone (25.68) followed by Amikacin (16.51%), Metronidazole (11.92%) ,Cefuroxime (7.33%) ,Levofloxacin (7.33%) , Ciprofloxacin (4.58%) , Tobramycin (3.66%) ,Meropenem (2.75%) ,Azithromycin (2.75%) ,Doxycycline (2.75%) , Cefoperazone ,Amoxicillin ,Gentamycin ,Ampicillin ,Cefixime ,Cefpodoxime and Clarithromycin(1.83%) each , Crystalline Penicillin (0.91%) (table 13). [9]

DISTRIBUITION BASED ON ANTIBIOTICS PRESCRIBED AS MONOTHERAPY

N=109, n=100

Table 13: Distribution based on antibiotics prescribed as monotherapy

NAME OF ANTIBIOTIC	NO OF PRESCRIPTION	PERCENTAGE (%)
Ceftriaxone	28	25.68
Amikacin	18	16.51
Metronidazole	13	11.92
Cefuroxime	8	7.33
Levofloxacin	8	7.33
Ciprofloxacin	5	4.58
Tobramycin	4	3.66

Meropenem	3	2.75
Azithromycin	3	2.75
Doxycycline	3	2.75
Cefoperazone	2	1.83
Amoxicillin	2	1.83
Gentamicin	2	1.83
Ampicillin	2	1.83
Cefixime	2	1.83
Cefpodoxime	2	1.83
Clarithromycin	2	1.83
Rifixime	1	0.91
Crystalline penicillin	1	0.91

In our study, most common antibiotic prescribed as combination is ceftriaxone + sulbactam (37.09%) followed by Cefoperazone + sulbactam (22.58%) (table 14).[10]

Table No 15: Distribution based on cost of cephalosporins

DISTRIBUTION BASED ON ANTIBIOTICS PRESCRIBED AS COMBINATION

N=62 n=100

Table No 14: Distribution based on antibiotics prescribed as combination

NAME OF COMBINATION	NO OF PRESCRIPTION	PERCENTAGE (%)
Ceftriaxone + Sulbactam	23	37.09
Cefoperazone + Sulbactam	14	22.58
Piperacillin +Tazobactam	8	12.90
Cefixime + Sulbactam	6	9.67
Cefpodoxime + Clavulanate	2	3.22
Ampicillin + Dicloxacillin	2	3.22
Amoxicillin + Sulbactam	2	3.22
Ceftriaxone + Tazobactam	1	1.61
Amoxicillin + Clavulanate	1	1.61
Cefuroxime + Sulbactam	1	1.61
Norfloxacin + Lactic Acid Bacillus	1	1.61
Cefixime + Clavulanate	1	1.61

DISTRIBUTION BASED ON COST OF CEPHALOSPORINS

NAME OF BRAND	NAME OF MANUFACTURER	DOSE	COST (PER TAB OR VIAL)
Inj Cefaxone	Lupin Ltd	1gm	34.71
Inj Gramocef	Micro Labs	1gm	56.14
Inj Oframax	Ranbaxy Pharma	1gm	64.40
Tab Ivatil	Iva Healthcare Pvt Ltd	500mg	52.25
Tab Furoxime	Faith Pharma	500mg	36.10
Tab Curotil	Iva Healthcare Pvt Ltd	500mg	43.00
Tab Cefolac	Macleods Pharmaceuticals Pvt Ltd	200mg	9.52
Tab Silcef	Rhombus Pharma Pvt Ltd	200mg	9.98
Tab Rhifix	Cipla Ltd	200mg	8.46

Inj Ceforlife	Lifecare Pharmaceuticals	1gm	221.35
Inj Surkef	Gland Pharma Ltd	1gm	237.50
Inj Cefomycin	Zydus Cadila	1gm	235.00
Tab Hhcepo	Hedge & Hedge Pharmaceuticals Ltd	200mg	13.11
Tab Cepodem	Sun Pharmaceutical Industries Ltd	200mg	15.87
Tab Macpod	Macleods Pharmaceuticals Pvt Ltd	200mg	13.30

Out of the 3 brands of Amoxicillin, Cap.Mox was found to be cost effective and cost minimised one. Cost of Cap.Mox is Rs.6.72 per tablet while costs of other brands are Rs.7.08 and Rs.45.13 respectively. Out of the 3 brands of Ampicillin, Cap.Roscillin was found to be cost effective and cost minimised one. Cost of Cap.Roscillin is Rs.6.25 per tablet while costs of other brands are Rs.13.67 and Rs.14.20 respectively (table 16).

DISTRIBUTION BASED ON COST OF PENICILLINS

Table No 16: Distribution based on cost of penicillins

NAME OF BRAND	NAME OF MANUFACTURER	DOSE	COST (PER TAB OR VIAL)
Cap Mox	Sun Pharmaceutical Industries Ltd	500mg	6.72
Tab Erox	Micro Labs Ltd	250mg	7.08
Mox Redimix	Sun Pharmaceutical Industries Ltd	125mg/60ml	45.13
Inj Roscillin	Ranbaxy Laboratories Ltd	500mg	13.67
Inj Campicillin	Cadila Pharmaceuticals Ltd	500mg	14.20
Cap Roscillin	Ranbaxy Laboratories Ltd	500mg	6.25

n=1 Out of the 3 brands of Levofloxacin, T.Aceflox was found to be cost effective and cost minimised one. Cost of T.Aceflox is Rs.7.90 per tablet while costs of other brands are Rs.8.39 and Rs.163.02 respectively. Out of the 3 brands of Ciprofloxacin, T.Cifran and T.Ciplox was found to be cost effective and cost minimised one. Cost of T.Cifran and T.Ciplox is Rs.3.79 per tablet while cost of other brand is Rs.17.56 respectively (table 17)

Table No 17: Distribution based on cost of Fluroquinolones

NAME OF BRAND	**NAME OF MANUFACTURER**	**DOSE**	**COST (PER TAB OR VIAL)**
Tab Levomac	Macleods Pharmaceuticals Pvt Ltd	500mg	8.83
Tab Aleflox	Alna Biotech Pvt Ltd	500mg	7.90
Tab Levobact	Micro Labs Ltd	500mg	8.83
Tab Cifran	Sun Pharmaceutical Industries Ltd	500mg	4.07
Tab Ciplox	Cipla Ltd	500mg	3.99
Tab Quintor	Torrent Pharmaceuticals Ltd	500mg	3.46

DISTRIBUTION BASED ON COST OF CEPHALOSPORINS AS COMBINATIONS

Table No18: Distribution based on cost of cephalosporins as combinations

Name Of Combination	Brand Name	Name Of Manufacturer	Dose	Cost (Per Tab Or Vial)
Ceftriaxone + Sulbactam	Inj Niczone-SB	Phytochem Healthcare Pharma	1000mg+500mg	123.50
	Inj Oframax Forte	Sun pharmaceutical Industries Ltd	1000mg+500mg	144.40
	Inj Traxol S	Cachet pharmaceuticals Pvt Ltd	1000mg+500mg	139.00
Cefoperazone + sulbactam	Inj Cefglobe S Forte	Micro Labs Ltd	1000mg+500mg	194.28
	Inj Cezon S	Aster pharmaceuticals	1000mg+500mg	171.00
	Inj Cefotum plus	Biotics Research	1000mg+500mg	370.50
Cefuroxime + Sulbactam	Inj Carerox	Life care Formulation Pvt Ltd	1500mg+750mg	318.25
	Inj Furokin S	Acekinetics Healthcare Pvt Ltd	1500mg+750mg	245.00
	Inj Keftas S	Medic Biologicals and pharmaceuticals Pvt Ltd	1500ng+750mg	296.00
Cefixime + Sulbactam	Tab Cefest S	Mestra pharma Pvt Ltd	200mg+150mg	30.40
	Tab Alencef SL	Alencure Biotech Pvt Ltd	200mg+125mg	35.00
	Tab Critcef S	Stellar Bio Labs	200mg+150mg	30.00
Cefpodoxime + clavulanate	Tab Microcef CV	Micro Labs Ltd	200mg+125mg	26.13
	Tab Papcef CV	Alna Biotech Pvt Ltd	200mg+125mg	32.30
	Tab Doxcef CV	Lupin Ltd	200mg+125mg	29.81
Cefixime + Clavulanate	Tab Gramocef CV	Micro Labs Ltd	200mg+125mg	28.03
	Tab Omnix CV	Cipla Ltd	200mg+125mg	22.00
	Tab Clacent	Cipla Ltd	200mg+125mg	20.90
Ceftriaxone + Tazobactam	Inj Eson T	Essar Formulations	1000mg+125mg	189.05
	Inj Ritecef T	Micro Labs Ltd	1000mg+125mg	142.33
	Inj Aacef T	Alpic Biotech	1000mg+125mg	155.00

The combinations of various antibiotics were analysed. Out of the 3 brands of the combination of Ceftriaxone and Sulbactam, Inj.Niczone SB was found to be cost effective and cost minimised one. Cost of Inj.Niczone SB is Rs.123.50 per vial while costs of other brands are Rs.144.40 and Rs.139.00 respectively. Out of the 3 brands

of the combination of Cefoperazone and Sulbactam, Inj.Cezox S was found to be cost effective and cost minimised one. Cost of Inj.Cezox S is Rs.171.00 per vial while costs of other brands are Rs.194.28 and Rs.370.50 respectively. Out of the 3 brands of the combination of Cefixime and Sulbactam, T.Critcef S was found to be cost effective and cost minimised one. Cost of T.Critcef S is Rs.30.00 per tablet while cost of other brands is Rs.30.40 and Rs.35.00 respectively. Out of the 3 brands of the combination of Cefuroxime and Sulbactam, Inj.Furokin S was found to be cost effective and cost minimised one. Cost of Inj.Furokin S is Rs.245.00 per vial while cost of other brands are Rs.296.00 and Rs.318.25 respectively. Out of the 3 brands of the combination of Cefpodoxime and Clavulanate, T.Microcef CV was found to be cost effective and cost minimised one. Cost of T.Microcef CV is Rs.26.13 per tablet while cost of other brands are Rs.32.30 and Rs. 29.81 respectively. Out of the 3 brands of the combination of Cefixime and Clavulanate, T.Clacent was found to be cost effective and cost minimised one. Cost of T.Clacent is Rs.20.90 per tablet while cost of other brands are Rs.22.00 and Rs.28.03 respectively. Out of the 3 brands of the combination of Ceftriaxone and Tazobactum , Inj.Ritecef T was found to be cost effective and cost minimised one. Cost of Inj.Ritecef T is Rs.142.33 per vial while costs of other brands are Rs.155.00 and Rs.189.05 respectively (table 18). Out of the 3 brands of the combination of Amoxicillin and Clavulanate, Syp. Augmentin DDS was found to be cost effective and cost minimised one. Cost of Syp. Augmentin DDS is Rs.123.55 while costs of other brands are Rs.137.75 and Rs.130.15 respectively. Out of the 3 brands of the combination of Amoxicillin and Sulbactam, Inj.Nimox SB was found to be cost effective and cost minimised one. Cost of Inj.Nimox SB is Rs.179.55 per vial while costs of other brands are Rs.204.25 and Rs. 250.00 respectively. Out of the 3 brands of the combination of Piperacillin and Tazobactum, Inj.Pizoglan was found to be cost effective and cost minimised one. Cost of Inj.Pizoglan is Rs.194.28 per vial while costs of other brands are Rs.232.88 and Rs.223.36 respectively. Out of the 3 brands of the combination of Ampicillin and Doxacillin, Cap.Baxin D was found to be cost effective and cost minimised one. Cost of Cap.Baxin D is Rs.5.95 per capsule while costs of other brands are Rs.7.21 and Rs.15.26 respectively (table 19).

DISTRIBUTION BASED ON COST OF PENICILLINS AS COMBINATION

Table No 19: Distribution based on cost of penicillins as combination

NAME OF COMBINATION	NAME OF BRAND	NAME OF MANUFACTURER	DOSE	COST (PER TAB OR VIAL)
Piperacillin + Tazobactam	Inj Tazomac	Macleods Pharmaceuticals Pvt Ltd	4000mg+500mg	232.88
	Inj Pizoglan	Gland Pharma Ltd	4000mg+500mg	194.28
	Inj Maxotaz	Macleods Pharmaceuticals Pvt Ltd	4000mg+500mg	223.36
Ampicillin + Dicloxacillin	Cap Ampilox	Biochem Pharmaceutical Industries Ltd	250mg+250mg	7.21
	Tab Ampilox DS	Biochem Pharmaceutical Industries Ltd	500mg+500mg	15.26
	Cap Baxin D	Hetero Drugs Ltd	250mg+250mg	5.95

Amoxicillin + Clavulanate	Syp Augmentin DDS	Glaxo Smith Kline Pharmaceuticals Ltd	400mg/5ml+ 57mg/5ml	123.55
	Syp Mox CV DS	Sun Pharmaceutical Industries Ltd	400mg/5ml+ 57mg/5ml	137.75
	Syp Claviluk Forte	Worth Medicines (I) Pvt Ltd	400mg/5ml+ 57mg/5ml	130.15
Amoxicillin + Sulbactam	Inj Salcure	JBS Life sciences Pvt Ltd	1000mg+500mg	204.25
	Inj Nemox SB	Bio nova Life sciences Pvt Ltd	1000mg+500mg	179.55
	Inj Synbeta	Alniche Life sciences Pvt Ltd	1000mg+500mg	250.00

PRICE VARIATION IN ANTIBIOTICS (MONOTHERAPY AND COMBINATION THERAPY)

Table No 20: Price variation in antibiotics (Monotherapy and Combination therapy)

DRUG	DOSE	MAXIMUM COST (RUPEES)	MINIMUM COST (RUPEES)	PERCENTAGE PRICE VARIATION (%)
Inj Ceftriaxone	1gm	64.40	34.71	85.53
Tab. Cefuroxime	500mg	52.25	36.10	44.73
Tab. Cefixime	200mg	9.98	8.46	17.96
Inj. Cefoperazone	1gm	237.50	221.35	7.29
Tab. Cefpodoxime	200mg	15.87	13.11	21.05
Inj. Ampicillin	500mg	14.20	13.67	3.87
Tab. Levofloxacin	500mg	8.83	7.90	11.77
Tab. Ciprofloxacin	500mg	4.07	3.46	17.63
Inj. Ceftriaxone+ Sulbactam	1000mg+500mg	144.40	123.50	16.92
Inj. Cefoperazone+ Sulbactam	1000mg+500mg	370.50	171.0	116.66
Inj. Cefuroxime+ Sulbactam	1500mg+750mg	318.25	245.0	29.89
Tab. Cefixime+ Sulbactam	200mg+150mg	35.0	30.0	16.66
Tab. Cefpodoxime+ Clavulanate	200mg+125mg	32.30	26.13	23.61
Tab. Cefixime+ Clavulanate	200mg+125mg	28.03	20.90	34.11
Inj. Ceftriaxone+ Tazobactam	1000mg+125mg	189.05	142.33	32.82
Inj. Piperacillin+ Tazobactam	4000mg+500mg	232.88	194.28	19.86
Syp. Amoxicillin+	400mg/5ml+ 57mg/5ml	137.75	123.55	11.49

Clavulanate				
Inj. Amoxicillin+ Sulbactam	1000mg+500mg	250.0	179.55	39.28

CONCLUSION

The study entitled "Pharmacoeconomic evaluation and prescribing pattern of Antibiotics in a tertiary care hospital" was a prospective observational study carried out in a period of 6 months in Surgery ,Cardiology ,Gynaecology , Neurology ,Orthopaedics ,General Medicine ,Paediatrics department of a 450 bedded tertiary care hospital . From the evaluation of prescribing pattern it was found that most of the patients were prescribed with antibiotics with other medications .Antibiotics given by systemic route is used more than other dosage forms . Cephalosporins were mostly prescribed class of antibiotics, Ceftriaxone and Amikacin were the most commonly prescribed antibiotics. The study also provides a baseline data for carrying out further studies on Pharmacoeconmic evaluation and prescribing pattern in a tertiary care hospital, which would provide information for improving the utilization of antibiotics in various health facilities. Pharmacoeconomic evaluation was done for the most commonly used Antibiotics and the Cost Minimisation Analysis was performed among the various brands of Cephalosporins, Penicillins, Fluroquinolones respectively. Out of the 3 brands compared for each antibiotic Inj.Cefazone (Ceftriaxone), T.Furoxime (Cefuroxime), T.Rhifix (Cefixime) , Inj.ceforlife (Cefoperazone) , T.Hhcepo (Cefpodoxime) ,Cap.Mox (Amoxicillin) , Cap.Roscillin (Ampicillin) ,T.Aceflox (Levofloxacin) , T.Cifran (Ciprofloxacin) were found to be the most cost effective and cost minimized one . Out of the 3 brands for each of the combination Inj.Niczone SB (Ceftriaxone and Sulbactam) , Inj.Cezox S (Cefoperazone and Sulbactam) , T.Critcef S (Cefixime and Sulbactam), Inj.Furokin S (Cefuroxime and Sulbactam) , T.Microcef CV (Cefpodoxime and Clavulanate), T.Clacent (Cefixime and Clavulanate), Inj.Ritecef T (Ceftriaxone and Tazobactam), Syp. Augmentin DDS (Amoxicillin and Clavulanate), Inj.Nimox SB (Amoxicillin and Sulbactam), Inj.Pizoglan (Piperacillin and Tazobactam), Cap.Baxin D (Ampicillin and Doxacillin) were found to be the most cost effective and cost minimized one.

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